



Scuttlebutt

No. 65 September 1986

| | | | |
|-----------------------|----------------------|------|--------------|
| President | Bill Santelmann | N1AU | 617-862-1753 |
| VP-Activities Manager | Ron Grzelak | K1BW | 203-848-3796 |
| Secretary-Treasurer | Charlotte Richardson | KQ1F | 617-562-5819 |
| Editor | Paul Young | K1XM | 617-562-5819 |

Captain's Cabin

Bill Santelmann, N1AU

Boxboro is almost here! The New England ARRL Convention and Flea Market comes to Boxboro, Mass., on October 18 and 19. It is held only every other year and is an event not to be missed. We have reserved four hours of prime time for the YCCC on Saturday afternoon, October 18. The official YCCC meeting will be at 1PM, followed by three hours of programs by YCCC members, as outlined elsewhere in this 'Butt.

If you like contesting, try to attend this meeting and meet the top testers in New England. If you would like to join us for the upcoming contest season as a member, we will welcome your application at this meeting. All members are expected, but not required, to contribute scores to the Club total for the CQWW and ARRL DX contests. All members will receive the 1986 edition of the YCCC Contest Cookbook written by the experts on each band, and including log forms, summary sheets, check sheets, and the K1KI Edge. Also, the latest information on the YCCC Packet Spotting Net will be announced.

As a YCCC member, you can call on your Area Manager for assistance in getting your station on the air for the CQWW contests, for operators to help keep it on the air for the whole 48 hours, or for finding a place to operate if you have no station. We missed first place in the CQWW last year by only 4%; all we need is more participation by our members to turn

that around. Our station scores are usually higher than those of the club that wins. Please do your best to contribute to a YCCC victory this year!

We are planning to test the Packet Spotting Net on the weekend of October 11 and 12, the week before Boxboro. We know there are some interference problems between the HF stations and the packet TNC's to be worked out. I'd like to suggest that you try your packet station while running full power on your HF station to test for packet integrity, and also check that the TNC is not interfering with HF reception. The time to remedy such problems is now!

The packet test will use the AK1A Packet Conference Board System in Amherst, NH, with many other stations providing "vias" to AK1A from virtually the entire YCCC area. Packets will be fully acknowledged, an improvement over the "unproto" system of last winter, and your screen will display only one copy of each spotting presented without transmission error. Spelling errors are another problem! Full details on the Spotting Net and the results of the tests on October 11 and 12 will be presented at the October 18 meeting.

In closing, I wish everyone the best of luck and good DX in the upcoming contest season! May your antennas stay high and your SWRs low.

Schedule for the Next Meeting

The next meeting will be on Saturday, October 18th, at the Boxboro ARRL New England Division Convention, starting at 1pm. The schedule of events is:

- **1 pm Yankee Clipper Contest Club Meeting.** Regular bimonthly business meeting of this famous New England-based club of contest aficionados. Awards. Humor. Information and strategy for the fall contest season. Non-members and guests welcome.
- **2 pm lecture.** Bill Myers, K1GQ, will speak on "Performance of 80-Meter Loop Arrays". Bill Myers, formerly K2SIL and KH6RS, is a well-known contesteer.
- **3 pm lecture.** Bill Shaheen, N1CQ, will speak on "Structural and Safety Considerations for Amateur Tower Installation". Mr. Shaheen is an expert on the civil engineering aspects of amateur radio.
- **4 pm slide shows of recent YCCC DX-peditions.** Any of the major DX contests will find at least one member of the Yankee Clipper Contest Club off in some exotic spot handing out points to the hungry mob back home. Color slides will be shown of three recent DXpeditions: HC8X (with commentary by K1XM/KQ1F), VP2V (K1RX), and VP5 (WB8BTH).

The new **regular** meeting place for the YCCC is the Sheraton Sturbridge Resort and Conference Center located on Route 20 in Sturbridge, Massachusetts, $\frac{1}{2}$ mile West of I-84 (first exit off I-84 when coming South from the Mass. Turnpike).

The meeting dates have been set for the rest of 1986/1987 and are as follows:

| DATE | DAY | DELI-LUNCH |
|------------------|----------------------------|--------------------|
| October 18, 1986 | (Meeting to be at Boxboro) | |
| December 7, 1986 | Sunday | 11:30 AM |
| February 7, 1987 | Saturday | 11:30 AM |
| April 5, 1987 | Sunday | 11:30 AM |
| June 6, 1987 | Saturday | 11:30 AM |
| August 2, 1987 | Sunday | Lakeside Bar-B-Que |
| October 3, 1987 | Saturday | 11:30 AM |
| December 6, 1987 | Sunday | 11:30 AM |

Note that the official meeting time for all meetings is the traditional 1:00 to 4:00 PM with the exception of the Lakeside Bar-B-Que in August, when the meeting is from 12:00 to 1:00 PM with the cookout to follow.

Floating

Paul Young, K1XM

I'm planning to give out the infamous Editor's Awards at Boxboro this year. If you think you qualify, and think I may not be able to tell this from the published contest results, let me know before the meeting.

If you are on packet, and have not checked your station for interference, now is the time to do it. There are two things you should do:

- You should tune around the ham bands with your packet station on, and make sure that you are not getting interference from your packet station or computer. Double check this with the HF antennas disconnected.
- Connect to AK1A, or whatever you are using for a relay, and see if you can communicate through it with your HF rig keyed and running a KW. Try all antennas, and rotate the beams.

If you have a problem there are several things to try. If you are hearing your packet station with your HF rig, wrap the leads to the TNC or computer through ferrite toroids or around ferrite rods. Also try improving the grounding of your TNC, computer, and power supply.

If you can't communicate while your HF rig is transmitting, disconnect the 2 meter rig from the transceiver, and see if you can hear packet stations while transmitting. If not, you are interfering with the 2 meter receiver. The easiest way to fix this is to install a stub, $\frac{1}{4}$ wave on 2 meters, shorted at the far end, in the feedline of the 2 meter rig. You may need two; separate them by $\frac{1}{4}$ wavelength if so. Have someone listen to your 2 meter packet signal while you are transmitting. If they can hear your HF station, you need to filter the power and audio leads to the 2 meter rig. If your 2 meter rig is clean, the problem is in your TNC or computer, in which case you should ground it and filter the leads to it.

Remember, if your packet station is unreliable, you are not only hurting yourself, but you are causing packet congestion which could slow down the whole multiplier spotting network.

Bill Poellnitz, K1MM, is able to import Emotator rotors. These are the rotors that the JA big guns use. Contact Bill for more information.

Secretary's Report Yankee Clipper Contest Club

The August YCCC barbecue meeting was held on 2 August 1986 at the Sheraton Sturbridge Inn and Conference Center in Sturbridge, Massachusetts, with 41

members and their guests attending the brief meeting.

Bill, N1AU, discussed plans for the club's participation in the Boxboro Convention on October 18th, when the club has 1-5 PM Saturday reserved for a meeting. The current plan is to have a one-hour meeting, followed by a lecture on 80m loop antennas by Bill, K1GQ, and then possibly DXpedition slides and a propagation discussion. "Contest Weekend Live" has also promised a return appearance. Hal, K8HVT, and John, K1AR (in absentia) were volunteered to organize the program. Charlie, W1BK, volunteered to get members to staff the club's information booth, which will run all weekend.

Bill, N1AU, asked the members who wrote articles for the **Contest Cookbook** last year to cover the same bands for this year. Articles for the **Contest Cookbook** should be sent to Paul, K1XM, by the end of September at the latest, to avoid a last-minute rush at the printer. Charlotte, KQ1F, had updated DX dupe sheets available for more comments before they (or the version produced by Dick, AK1A) are incorporated into the **Contest Cookbook**. Comments on the dupe sheets should be sent to Dick, AK1A, or Charlotte, KQ1F, by the end of September. We expect to have the **Contest Cookbook**, as well as introductory information about the club, available at the club's information booth at Boxboro.

Ed, KA2MXO, has a friend who is selling a TS-930S. Contact Ed for details. Ed also mentioned that he will be operating from VE7EXPO in Vancouver and hopes to work fellow club members.

Charlie, W1BK, reported that Rivendell has shipped back to Kenwood their entire stock of TS-940s.

Log sheets for the Worked All Europe and the All Asia contests were available.

The club welcomed two new members:

Steve King, KA2ZPD

Phil Sager, WB4FDT

After this abbreviated business meeting, 45 members and guests and their children enjoyed a cookout and swim at the hotel's beach.

Respectfully submitted,
Charlotte L. Richardson, KQ1F
Secretary/Treasurer
7 August 1986

Contest Situations Wanted

Paul Young, K1XM

In the Western part of Massachusetts KY1H is looking for operators for a CQ WW CW Multi-Single (+

packet) operation. Dave has a nice station, and should place well this year.

In Eastern Mass, K1XM is looking for operators for Multi-Single, also with packet, on both modes. Come help make points for the club.

KN1K is looking for a station to operate for ARRL Sweepstakes CW. If you are one of those people who say "Sweepstakes? Is that a contest?" bring in a hired gun and find out.

TS-940S Performance, Part 2

Bill Myers, K1GQ

In *Scuttlebutt* 62, March, 1986, I roundly criticized the TS-940S based on receiver phase noise performance as directly compared to the TS-930S. The important point (to me), was that because the same noisy oscillators are used in the transmit stage, it is reasonable to assume that the transmitted noise performance is just as bad. If so, it is not enough that I don't use a TS-940S myself, it is just as important that no one louder than about 20 dB over S9 uses one either, or I will hear their transmitter's garbage. It's not easy to separate receiver-generated garbage from transmitted junk, but I'm sure that all of you have experienced problems with stations that aren't unnaturally loud yet do sound unusually trashy.

The purpose of this article is to summarize two excellent technical product reviews that appeared in different UK amateur radio journals (thanks to AK1A and K1KI for forwarding copies to me). Both reviews are remarkably comprehensive, especially when compared to those available in our US ham magazines. As before, I will confine my attention to this issues related to receiver phase noise and transmitted garbage.

The first review, titled "Trio TS-940S Multimode Transceiver," by Angus McKenzie, G3OSS, appeared in *Amateur Radio*, July, 1985. The reviewer criticized the reciprocal mixing performance (which I have been calling phase noise), to the point where the dealer that supplied the reviewer's unit - Lowe Electronics - modified the radio. These modifications were measured as reducing the phase noise by 12 dB in the SSB bandwidth at 5 kHz offset. The measurements that John and I made (with CW bandwidth) showed the stock TS-940S to be 10 dB worse than a stock TS-930S. Although the two measurement techniques aren't directly comparable, the phase noise performance of the modified TS-940S should be slightly better than the stock TS-930S.

The Lowe mod adds filters in two of the VCO loops, and changes four capacitors on the PLL board. Changes in the VCO loop are certain to alter the fre-

quency acquisition characteristics. For example, one of the VCOs must jump from one end of its range to the other every 10 kHz, which causes a small pop in a normal TS-940S. I've heard that the Lowe modifications degrade the acquisition performance so badly that the pops are very obnoxious, and that breakin is virtually useless because most of the first morse code element is lost while the synthesizer tries to lock up. Unfortunately, G3OSS didn't measure this aspect of synthesizer performance, although he did an admirable job in most other areas.

As I intimated in Part 1, I'm suspicious of any simplistic efforts to enhance performance of complex closed-loop systems, such as this one. Although I can't recommend the Lowe modification, I'll document it here in case some fearless TS-940S owner wants to experiment with it. The two loop filters, Fig. 1, are inserted in series with two lines, VC1 and VC2, between the PLL Unit and the RF Unit. My copy of the article is smudged, so I'm not positive about the value of R2 for the VC2 filter. Four capacitors on the PLL Unit are changed to 4.7 μ F tantalums: C184, C185, C186, and C187. These capacitors are to mitigate the "slightly compromised" tuning glitches at 10 kHz intervals.

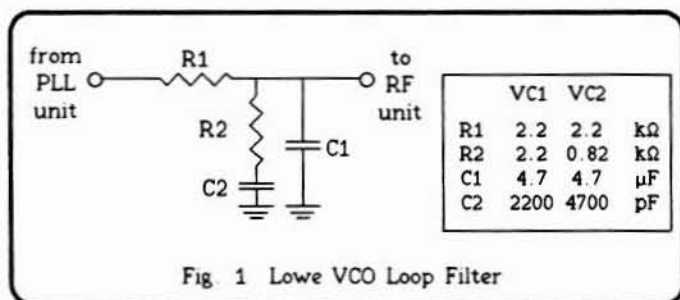


Fig. 1 Lowe VCO Loop Filter

Peter Hart, G3SIX, authored "Trio TS930S and TS940S HF Transceivers" in *Radio Communication*, May, 1986. This excellent technical product review has two interesting tidbits of information. First, the reciprocal mixing measurements show the TS-940S as 6 dB better than the TS-930S in the SSB bandwidth at 5 kHz offset. After the tests, the reviewer discovered that the TS-940S had the Lowe modifications installed! (Unfortunately, he didn't measure synthesizer frequency acquisition performance.) Second, Peter also measured the transmitter noise output relative to the carrier (21.4 MHz) in a 2 kHz bandwidth, and found the puzzling results shown in Table 1. Note that the TS-940S is 7 dB worse than the TS-930S at 5 kHz offset, which is inconsistent with the receiver phase noise performance comparison given above. Evidently, the noise output of the TS-940S transmitter is not dominated by the local oscillator, as I had assumed. Further evidence of this is seen in the table: the noise does not drop off as the offset increases for the TS-940S measurements, as it does for the TS-930S. This dropoff is expected for oscillator phase noise (as

seen in Part 1). Another important point: the noise measured at full output power was also present at the low power transverter output. Thus, the traditional whipping boy, the "broadband solid state power amplifier," cannot be the source of the high noise output of the TS-940S.

Table 1 Transmitter Output Noise

| Offset | 5 | 10 | 20 | 50 | kHz |
|---------|-----|-----|-----|-----|-----|
| TS-930S | -79 | -83 | -85 | -88 | dBc |
| TS-940S | -72 | -72 | -72 | -74 | dBc |

Even with the Lowe modifications (which overall probably do as much damage as good), the TS-940S transmitter is markedly inferior to the TS-930S transmitter in terms of unwanted noise output. This seems to me to be an abnormality that someone with adequate instrumentation (i.e., Kenwood) could easily diagnose and correct.

© Bill Myers, K1GQ, 1986, for the Yankee Clipper Contest Club **Scuttlebutt**. This article may be reprinted without my permission only if this notice is included.

[Editor's Note - According to **The DX Bulletin**, Kenwood Service Bulletin 911, just released, contains a modification which reduces TS-940 phase noise by 15 dB. It involves passive component changes. More info next issue.]

1987 ARRL Contest Schedule

Billy Lunt, KR1R

| | | |
|-----|-------|----------------------------|
| Jan | 1 | Straight Key Night |
| | 10-12 | January VHF SS |
| | 24-1 | Novice Roundup |
| Feb | 21-22 | DX Test CW |
| Mar | 7-8 | DX Test SSB |
| Apr | 13 | 144 MHz Spring Sprint |
| | 21 | 220 MHz Spring Sprint |
| | 29 | 432 MHz Spring Sprint |
| May | 8 | 902 MHz Spring Sprint |
| | 14 | 1296 MHz Spring Sprint |
| | 23-24 | 50 MHz Spring Sprint |
| Jun | 13-15 | June VHF QSO Party |
| | 27-28 | Field Day |
| Jul | 11-12 | IARU World HF Championship |
| Aug | 1-2 | UHF Contest |
| Sep | 12-14 | September VHF QSO Party |
| Nov | 7-9 | Sweepstakes CW |
| | 21-23 | Sweepstakes SSB |
| Dec | 4-6 | 160-Meter Contest |
| | 12-13 | 10-Meter Contest |

Antenna Switching for Multi-Single Stations

Paul Young, K1XM

My first real experience with Multi-op was at the K1PR multi-single operations in the late 1970s. We had lots of antennas, mostly fed with hard-line. The hard-lines terminated just inside the basement window, and we ran RG-8 to the rigs. Each rig had its own coax switch, and we moved antennas by unscrewing the coax from one switch and moving it to another. Eventually we had a braided mess, and the coaxes would no longer reach the switches. So we would add a barrel and some more coax. By the end of the contest we had to take coaxes off the less useful antennas to make the rest reach! When it came time to build my own station, I decided that there had to be a better way.

My goal was simple: Any antenna had to be accessible from either station. No coax cables should have to be moved during a contest. And it should be foolproof.

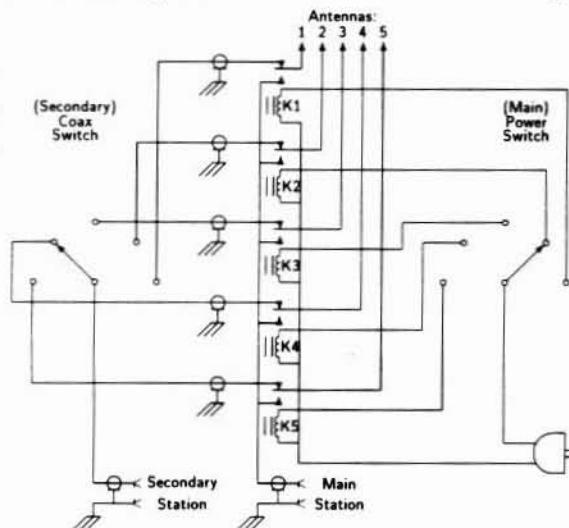


Figure 1.

One of the club newsletters I read had an article on this subject, and the schematic is shown as figure 1. Unfortunately, I don't have the source for this article any more, and I do not remember the author's name. This circuit has a moderate parts cost. However, if the main station switches past the antenna the secondary station is using, the second station may transmit into an open coax, or worse a coax relay may be hot-switched. This was not sufficiently foolproof.

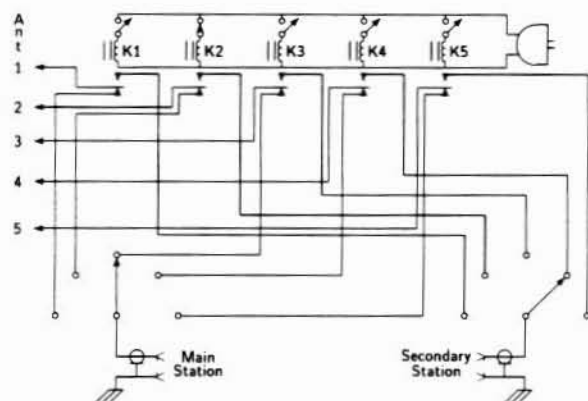


Figure 2.

I designed my own system, shown in figure 2. Although the circuit is shown for 5 antennas, I built it for 11. My construction method was simple. I mounted 11 switches in a box. I bought a Heathkit outlet strip, and ran 12 conductor cable from the switch box to the outlet strip, and wired it so that each switch controlled one outlet. I used 110 volt Dow Key type relays, wired a 3' piece of zip cord to each relay, and put a normal plug on the end. This makes things very flexible; I can rewire things easily when my antennas change. The coax switches are standard B&W parts. I used 2 per station, giving 11 positions. Each antenna is on the same coax position on both stations. Even though it required more parts I liked this scheme because in operation it normally provides a relay and a coax switch between the two stations.

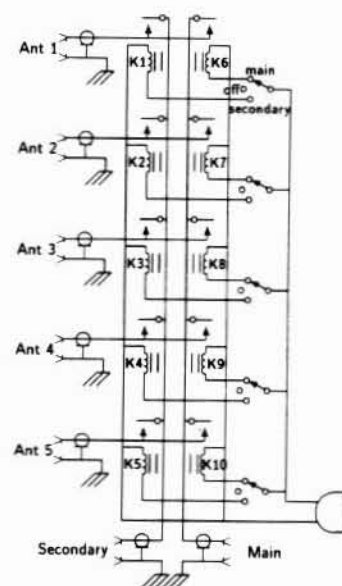


Figure 3.

I later heard about how Ira, K2RD, solved the problem in his station. His circuit is shown in figure 3. Ira built his system in two identical boxes, 8" x 14" and approximately 3" high. The layout for a box is shown in figure 4, and their interconnection is shown in figure 5. The stubs assume monoband antennas. Ira says, "The isolation is obviously best on the lowest freqs, but acceptable on all bands. I took extreme care to assure that the antenna input to relay wire was as short as possible and oriented the relays accordingly". The control box uses 8 SPST center-off toggle switches to control the relays. The center position deselects the antenna, the other positions connect the antenna to one of the stations. Although it is possible to accidentally connect two antennas to one station, it is impossible to connect the stations together. Also, this system has the advantage of being upgradable to computer control, à la K1GQ. All antenna control is from a central location; whether this is an advantage or disadvantage depends on your station layout.

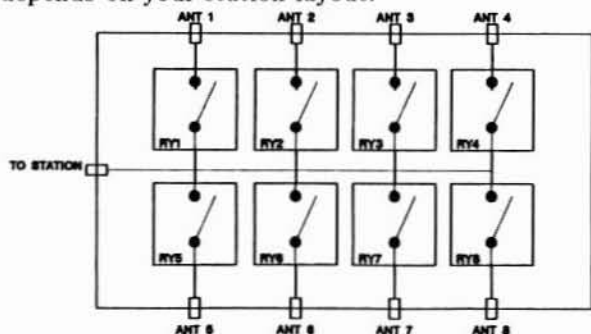


Figure 4.

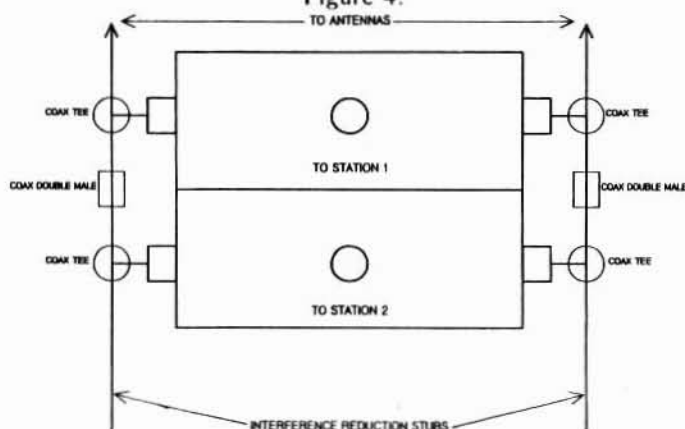


Figure 5.

If you are building a multi-station antenna switch, the thing to be most careful about is inter-station isolation. It's all too easy to blow a receiver front end. A TS-930 with service bulletin #868¹ optional section installed is capable of withstanding antenna input levels of up to 50 watts. However, the resistors in the RF attenuator are only good for $\frac{1}{4}$ watt; any more and you will get to remove the 22 screws which secure the Signal board in order to fix it! Large amounts of RF are also likely to cause intermodulation and other problems even if they don't damage the radio.

Although inexpensive switches can be used on the low bands, isolation on the high bands can be a problem. Table 1 shows the switch isolation for the inexpensive RF switches shown in August QST². These switches used wall toggle switches. As you can see, these would be acceptable on 160-40 meters, but probably not on the higher bands. K1GQ and KM1H have run tests on open frame relays. Although they vary from model to model, they will require special care to use above 40 meters. Some relays had only 30 dB isolation at 28 MHz. Running the legal limit with these you would dump $1\frac{1}{2}$ watts into the other station's receiver! If you buy relays, Carl suggests that you try to find relays which do not have the common wires run to the block (or modify those that do) and that relays that look like they will have poor isolation generally will. Testing homebrew coax relays is simple if you have an RF voltmeter. If not, you can test a relay by placing a $\frac{1}{8}$ watt 50 ohm resistor on one port, and running the legal limit through the relay. If the resistor gets warm, so will your front end!

One trick which can be used to increase isolation is to use a quarter wavelength of wire between the relay and the station. When the relay is open this will cause an RF short at the rig. This only works for one band, though. Also, if you cascade relays for better isolation, it is advisable to put a quarter wave of coax between them, as the VHFers do. Otherwise the isolation will not add as you might expect.

Homebrew coax switches are also easy to make³. Try to get switches with grounding sections, and use a neat layout to keep the isolation high.

You can also save money by eliminating the coax connectors and soldering in the coax, although you will have a harder time changing your station arrangement. But don't skimp on the coax - Radio Shack RG-8 type is NO BARGAIN! Buy coax with good shielding. I have heard of one station which solved its interference problems by careful grounding and by replacing all the jumper cables with double-shielded RG-214/U!

Thanks to K2RD, KM1H, K1GQ, AA2Z, and K1VR who helped with information presented in this article.

Table 1. Switch Isolation of RF switches made from toggle switches:

| Band | Isolation |
|------|-----------|
| 160 | 60 dB |
| 80 | 56 |
| 40 | 49 |
| 20 | 43 |
| 15 | 39 |
| 10 | 37 |

References:

¹ Kenwood service bulletin #868 contains an optional circuit which makes the front end less susceptible to damage. The service manual shows that this circuit is incorporated in radios with a serial number greater than 3100000. I have installed the circuit in two radios. It takes about 15 minutes and the parts cost is two or three dollars. I highly recommend it.

² QST, August 1986, Pages 25-27, *Inexpensive RF Switches for the Ham Shack*, by Paul Follini, VE1CZX.

³ QST, June 1981, Pages 30-33, *Julie's Custom Antenna Switch*, by Peter O'Dell, KB1N.

© Paul Young, K1XM, 1986, for the Yankee Clipper Contest Club **Scuttlebutt**. This article may be reprinted without my permission only if this notice is included.

Tools, Clothing, Parts and Consumables Required to Erect a Rohn Tower

Fred Hopengarten, K1VR

Copyright © Channel One, Inc., 1986

[This is a list of what Fred likes to have available when installing a tower. Compare it to your own list. - Ed.]

Tools

- **Gin pole.** Also known as an "erection fixture".
- **Rope for the gin pole.** Some nylon content (for stretch) is beneficial. To erect a 100 foot tower, use a 250 foot rope.
- **Pulley, to match gin pole rope.** Mount at bottom of tower so that rope can be pulled away from tower, not straight up and down. This will permit ground worker to work away from falling objects.
- **Climbing belts (2).**
- **Drift pin.** Sometimes called a "bull pin", one per tower worker. A 10" lining-up punch that tapers from about $\frac{1}{2}$ " to $\frac{5}{32}$ " diameter over a $6\frac{1}{2}$ " length for aligning bolt holes.
- **Bolt cutters.** For cutting the $\frac{3}{16}$ inch EHS (or $\frac{1}{4}$ inch) guy wire
- **Socket wrenches (2).** Two per tower worker. Rohn tower uses two different sizes of bolt. Having two socket wrenches avoids the need to constantly change sockets from one size to another.
- **Open end wrenches (2).** Two per tower worker, one for each size bolt.
- **Additional wrenches.** For rotor plates or torque bars.

- **Gas pliers.** Useful for the last twist of the guy grip.
- **Rubber mallet.** Used to convince two sections of tower that they should mate.
- **Canvas tool bag.** Canvas so that if it swings into a worker's leg, or into an antenna, no harm is done.
- **Utility rope.** For hauling up tools, the tools bucket, cold drinks, and so forth. Avoid light polypropylene, as too prone to fouling.
- **Grease gun.** You should grease the mail tower end to ease the fit, and permit easier disassembly - should it ever be necessary.
- **Come-Along.** Also called a "coffin hoist". Permits a worker to tighten a guy wire more than pulling by hand could accomplish.
- **Half-round file.** Use to smooth burrs of galvanizing.
- **A BIG screwdriver.** Provides leverage to tighten a turnbuckle.

Parts

- **Guy wire.**
- **Turnbuckles.** One per guy wire. At least one spare, in case the threads of one turnbuckle are fouled.
- **Wire rope clips (11).** Galvanized only. Must be same as guy wire size. To hold the safety wire (9), a spare (one will fall into the snow and get lost), and one to hold the come-along to the guy wire when tensioning the guy wire.
- **Guy grips.** Also known as "big grips" or "dead ends", two per guy wire (unless you are going to break up the guys with insulators, in which case you'll need more). Must be same as guy wire size. Make sure that these are the long kind. If near the sea, or in a corrosive environment, be sure to get the thick coating version.
- **Thimbles.** One per guy grip, to protect the guy grip from kinking under tension. Use $\frac{1}{4}$ " size, even for $\frac{3}{16}$ " EHS cable.
- **Extra bolts.**
For Rohn 25 tower:
3 bolts, $\frac{1}{4}$ " diameter by $1\frac{1}{2}$ " long, NF bolts
3 bolts, $\frac{5}{16}$ " diameter by $1\frac{1}{2}$ " long, NF bolts

For Rohn 45 tower:
3 bolts, $\frac{5}{16}$ " diameter by $2\frac{3}{8}$ " long, NC bolts
3 bolts, $\frac{7}{16}$ " diameter by $2\frac{1}{2}$ " long, NC bolts

Some will drop, some will be prematurely rusted. Be sure to have both sizes. Try to get them in stainless steel, as the galvanized version may be hard to find.

- **Insulators (and additional guy grips).** But only as necessary to break up guy wires into non-resonant lengths.

Clothing

- **Parka or jacket.** It is always colder 100 feet up and exposed.
- **Leather gloves.** One pair per worker, to prevent rope burns.
- **Hard hat.** Especially important for the ground worker.
- **Sun glasses (if it is sunny).** There is no shade on a tower.
- **Steel shank shoes.** Four hours of standing on a thin bar can make your arches ache but good.

Consumables

- **Grease.** In case the grease gun runs dry.
- **Never Seize** or similar brand anti-seize compound. Simply dip the stainless steel in to prevent seizing up, or you'll break 10% (in my experience) of your stainless steel bolts trying to loosen them.
- **Rags.** You'll need a few to spread the grease, to control the spread of grease, and to wipe off metal shavings from filing.
- **Canned soda.** You can't very well send up a glass, can you?
- **Sun tan lotion.** Remember, there is no shade up there.
- **Black electrician's tape.** How else can you send up one bolt?

Automatic Lightning Protection?

Tom Frenaye, K1KI

Ever felt that sinking feeling in your stomach when you were at work and a BIG thunderstorm exploded outside your window? Even with the coax and electrical plugs disconnected at home, lightning can still do damage, so it's always a worry. Now enter the world of remote sensing and computer technology!

Seems an Arizona company has been marketing something to locate and map lightning strikes for several years, with customers such as the U. S. Forest Service. When summer thunderstorms cross California's Sierra Nevada mountains, hundreds of lightning strikes can start up many forest fires and because the region covered is so large and so densely populated, some of them may not be stopped for many hours, enough time to get completely out of control.

With a way to pinpoint the locations of the lightning strikes, ground and air observers can quickly assess the

hazards and order corrective action. So what might this have to do with Amateur Radio? Plenty! The same technology that can discern a lightning strike from the other atmospheric noises and determine its direction (three sensors are needed for triangulation), can also judge how far away it is and whether it is moving towards or away from you – and warn you if it is too close! The most difficult part of the whole thing is discerning between what is lightning and what isn't – and LL&P holds a number of patents in that area.

Imagine a device that would set off a warning if there was lightning within 10 miles of your QTH, or perhaps it would automatically disconnect your equipment and antennas (physically and electrically). Well, it doesn't exist yet – but it could. The commercial version of this lightning locating equipment is manufactured by Lightning Location and Protection, 1001 South Euclid Avenue, Tucson, AZ 85719 (602-624-9967). It is expensive, consisting of three remote sensors (\$18K), communications equipment and modems (\$25K) and a sophisticated monitor and CPU to digest the remote data (\$25K). Figure on something like \$100K for the whole installation!

Of course for amateurs, a sophisticated monitor isn't necessary, nor is a remote sensor miles away from the QTH. What is needed is a sensor that is activated by nearby lightning that can be used to warn us or take action. Anyone interested in building me one for \$100?

Lightning Detection Network

submitted by Tom Frenaye, K1KI

In Connecticut, in an average year, a state resident's chances of getting hit by lightning are one in 1.5 million, based on Storm Data statistics. The chances of winning the jackpot in the state's Lotto game on the purchase of a single ticket in a year are one in 3.8 million.

In fact, though it may offer slim comfort to a worried golfer or hiker watching storm clouds roll in, scientists can now predict with great precision the number of times that lightning will strike a particular square mile or two in a year. They can steer planes around pockets of lightning only seconds old and tell utilities in advance where their repair crews will probably be needed.

The State University of New York at Albany Lightning Detection Network comprises 30 direction finders spread along the East Coast and as far west as the Mississippi River, says network director Richard Orville. Each direction finder is a set of antennae and a microcomputer that picks up the radio waves emitted by lightning flashes. "You hear this same energy if you're going along in your car and there's a lightning

flash nearby," Orville explains. "You'll hear static on your radio. To you, that's just noise. To us, it's useful information."

Linked by phone lines to a central computer in Albany, the information from different direction finders is triangulated to plot the location of lightning. Using the stored records of 10 million lightning strikes located since the network started up in mid-1983, the network will soon publish a report that will map out lightning strike densities with unprecedented detail, Orville says. "You might ask me, 'What's the lightning variation around the Connecticut River vs. that on either side of the Connecticut Valley?' and network statistics could give exact answers," Orville says.

Originally funded by the electrical utilities and government agencies such as the National Aeronautics and Space Administration, the network is finding new clients for its lightning locator services. For example, the Federal Aviation Administration's air traffic control center in Virginia receives an update on lightning activity from the network every seven or eight seconds on a color display terminal, Orville says. "They'll steer the aircraft around those [thundercloud] cells producing active lightning," he says. And insurance companies are finding the network to be a valuable tool. "There are a number of people who will claim that their television or VCR was damaged by lightning," says Orville. The network's data base tells insurance companies whether there was lightning in the claimant's area on the day the damage supposedly occurred. "A lot of people are getting caught, quite frankly," Orville says.

Score Rumors:

CQ WPX CW:

| Call | QSOs | PFXs | Score |
|-----------|------|------|---------|
| K8HVT/KP2 | 1440 | 513 | 2202822 |

IARU HF Radiosport:

| Call | QSOs | MLTs | Score |
|-------|------|------|--------|
| K1VUT | 1074 | 88 | 385000 |

Movers

Update your club roster to indicate these changes:

K1RQ's new work phone number is (413)296-4751.

K1RU's new data:

Gene Frohman, K1RU

52 Ridgewood Drive

Bethany, CT 06525

home phone: (203)393-1772

work phone: (203)386-6137

New address for the Peacors, K1IJU and K1IJV:
Box 389
East Orleans, MA 02643

New work phone for Bill, K1MM: (617)235-2000.

New Crew

Welcome to the following new members, who joined at the August barbecue meeting:

Phil Sager, WB4FDT
126 Whiting
West Hartford, CT 06119
home phone: (203)233-4843
work phone: (203)666-1541

Steven King, KA2ZPD
Box DX
Cottekill, NY 12419
home phone: (914)687-9700

Excess Cargo

For sale:

Alliance T-45 TV-type rotors. \$25. New. Contact Ron, K1BW, at 203-848-3796.

Excellent condition - Kenwood TS-520-SE transceiver with cw filter installed and service manual. DG-5 Digital display/frequency counter. AT-200 Antenna tuner/switch/SWR meter. MFJ oil-filled dummy load. \$600. Call Dallas, K1DW, at (203)521-9117 or KA1EHO at (203)537-1132 after 5 pm.

For sale: FT101E \$300 and Drake R4 \$50. Need: 813s, Drake L7 or similar amp with 160m. Contact Al, W1FJ.

The **Scuttlebutt** is the newsletter of the **Yankee Clipper Contest Club** and is mailed six times per year to all paid up members. Dues are \$10 per year, payable 1 April with a grace period through 30 June. Non-members may subscribe to the **Scuttlebutt** by sending \$10 to the Treasurer: Charlotte Richardson, KQ1F, 11 Michigan Drive, Hudson, MA 01749. Subscribers who subsequently become members will be credited as having paid dues.

The **Scuttlebutt** may be reprinted in whole or in part, except for separately copyrighted articles, provided proper credit is given.

The **Yankee Clipper Contest Club** (an ARRL Affiliated Club) holds six official meetings per year, on the Saturday or Sunday afternoon of the first full weekend of every even month in the Sturbridge, Massachusetts, area. The deadline for article submission to the **Scuttlebutt** is three weeks before the next meeting date. The next meeting will be on 18 October 1986 at the Boxboro Convention. Attendance at an official meeting is required in order to become a member. Club members congregate on 3830 Khz or 1900 Khz Monday evenings; many routinely monitor these frequencies other evenings as well.

Rosters are mailed to all paid members each summer. For more information and/or assistance, contact the area manager nearest you on the following list:

| Area | Call | Name | Home | Work |
|--------|------|---------------|----------------|----------------------|
| CT/RI | K1RX | Mark Pride | (203) 271-2076 | (203) 265-8825 |
| EMass | W1FJ | Al Rousseau | (617) 598-3744 | (617) 599-7500 x 173 |
| WMass | KY1H | Dave Robbins | (413) 655-2714 | (413) 494-5618 |
| VT/NH | KM1C | Bill Pedersen | (603) 673-1678 | |
| ME | K1SA | Bernie Cohen | (207) 773-6589 | (207) 797-3585 |
| NNY | K2RD | Ira Stoler | (518) 439-5804 | (518) 445-8474 |
| SNY/NJ | K2EK | Bill Gioia | (914) 221-1672 | (212) 888-2102 |

YCCC

11 Michigan Drive
Hudson MA 01749

FIRST CLASS